

CLAIMS

What is claimed is:

1. A system for use in controlling electrical therapy delivered to a heart, comprising:
 - a first circuit that is charged to deliver high-voltage electrical stimulation to the heart;
 - a second circuit to deliver anti-tachy pacing (ATP) therapy to the heart;
 - a control circuit coupled to the first and second circuits to adjust a time of charging of the first circuit relative to a time of delivering ATP therapy based on predetermined criteria.
2. The system of Claim 1, wherein the control circuit includes means for operating in an ATP-DCC mode to initiate charging of the first circuit during delivery of the ATP therapy.
3. The system of Claim 2, wherein the control circuit includes means for operating in an ATP-BCC mode to initiate charging of the first circuit after the delivery of the ATP therapy.
4. The system of Claim 3, wherein the control circuit includes means for transitioning between the ATP-BCC mode and the ATP-DCC mode based on predetermined criteria related to the effectiveness of the previously-delivered ATP therapy.
5. The system of Claim 4, wherein the control circuit includes means for transitioning from the ATP-BCC mode to the ATP-DCC mode based on a first parameter indicating a number of failed ATP therapy delivery attempts while operating in ATP-BCC mode.
6. The system of Claim 5, wherein the first parameter is measured as a number of failed ATP attempts out of a total number of ATP therapy attempts delivered.

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7. The system of Claim 5, wherein the control circuit includes means for transitioning from the ATP-DCC mode to the ATP-BCC mode based on a second parameter indicating a number of successful ATP therapy delivery attempts while operating in ATP-DCC mode.
8. The system of Claim 7, and further including a storage device coupled to the control circuit to store the first and second parameters, and wherein at least one of the first and second parameters are programmable.
9. The system of Claim 7, wherein the second parameter is measured as a number of successful ATP attempts out of a total number of ATP therapy attempts delivered.
10. The system of Claim 7, and further including at least one electrode coupled to the control circuit to sense cardiac rhythms, and a processing circuit coupled to the control circuit to analyze types of the cardiac rhythms, and wherein the predetermined criteria takes into account the types of the cardiac rhythms occurring in the heart.
11. The system of Claim 10, wherein the control circuit includes means for utilizing different values for the first and second parameters, each of the values being respectively associated with a type of cardiac rhythm occurring during delivery of the ATP therapy.
12. The system of Claim 1, and further including a storage device coupled to the control circuit to store the predetermined criteria, and wherein the predetermined criteria is programmably selected to be specific to a given patient.
13. The system of Claim 1, and further including at least one electrode coupled to the control circuit capable of detecting rhythms of the heart, and wherein the predetermined criteria is based on a length of one or more of the detected rhythms of the heart.

14. The system of Claim 10, wherein the control circuit further includes means for adjusting the time of charging of the first circuit relative to the time of delivering ATP therapy based on a frequency of occurrence of one or more of the cardiac rhythms.

15. The system of Claim 14, wherein the control circuit includes means for transitioning from the ATP-DCC mode to the ATP-BCC mode based on a detection of VT storms, wherein a predetermined number of VT rhythms are detected within a predetermined period of time.

16. The system of Claim 10, wherein the predetermined criteria includes criteria associated with a change in a type of cardiac rhythm occurring prior to the delivery of the ATP therapy.

17. The system of Claim 16, wherein the control circuit includes means for transitioning from the ATP-BCC mode to the ATP-DCC mode based on the criteria associated with a change in a type of cardiac rhythm occurring during the delivery of the ATP therapy.

18. A method for use in delivering electrical stimulation to a heart, comprising the steps of:

- a.) delivering anti-tachy pacing (ATP) therapy to a patient's heart;
- b.) charging a high-voltage capacitor in preparation to deliver high-voltage electrical stimulation to the heart; and
- c.) controlling a time of performing step b.) in relation to a time of performing step a.) based on a predetermined set of criteria.

19. The method of Claim 18, wherein the predetermined set of criteria is programmable, and further including the step of programming the predetermined set of criteria.

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20. The method of Claim 18, wherein step c.) includes operating in a ATP-DCC mode wherein substantially all of step a.) is performed during step b.).

21. The method of Claim 20, wherein step c.) includes switching from the ATP-DCC mode to a ATP-BCC mode wherein substantially all of step a.) is performed before step b.) is performed, the switching being based on the predetermined set of criteria.

22. The method of Claim 21, and further including
monitoring effectiveness of the ATP therapy in terminating abnormal cardiac rhythms; and
wherein step c.) is performed based on the predetermined set of criteria, which takes into account the effectiveness of the ATP therapy in terminating abnormal cardiac rhythms.

23. The method of Claim 22, wherein step c.) further includes switching from ATP-BCC mode to ATP-DCC mode based on the predetermined set of criteria.

24. The method of Claim 23, wherein the switching from ATP-BCC mode to ATP-DCC mode occurs after unsuccessfully delivering ATP therapy a first predetermined number of times while in ATP-BCC mode.

25. The method of Claim 24, wherein the switching from ATP-DCC mode to ATP-BCC mode occurs after successfully delivering ATP therapy a second predetermined number of times while in ATP-BCC mode.

26. The method of Claim 21, and further including analyzing morphology of cardiac rhythms detected in the heart; and
wherein the predetermined set of criteria in step c.) is based on the morphology of cardiac rhythms detected in the heart.

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27. The method of Claim 26, wherein step c.) further includes switching from ATP-DCC mode to ATP-BCC mode based on a frequency of occurrence of predetermined ones of the cardiac rhythms detected in the heart.

28. The method of Claim 27, wherein step c.) further includes switching from ATP-DCC mode to ATP-BCC mode based on detection of VT storms, wherein a predetermined number of ventricular tachycardia (VT) episodes are detected within a predetermined period of time.

29. The method of Claim 26, wherein step c.) further includes switching from the ATP-BCC mode to the ATP-DCC mode based on a change in the morphology of the cardiac rhythms detected in the heart.

30. The method of Claim 22, and further including discontinuing step a.) after unsuccessfully delivering ATP therapy a predetermined number of times.